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SPECIAL REPORT NO. 3

SEASONAL PATTERNS OF FOOD CONSUMPTION

City Families, 1948

Based on Food Consumption Surveys of 1948-1949

UNITED STATES DEPARTMENT of AGRICULTURE
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This report presents seasonal patterns in the food consumption of United States urban families. The patterns were derived from data on types and quantities of foods consumed by housekeeping families in four cities in diverse sections of the country during various seasons of 1948 and 1949. Most of the basic data used have been published in a series of processed reports available upon request. (See inside back cover for list of reports.) A description of the method used in combining the four city data into a national seasonal pattern is given on pages 10-15 of this report.

By applying the seasonal indexes contained in this report to spring 1948 data on average food consumption of families living in 68 cities throughout the United States (Preliminary Report No. 5), estimates of the 1948 annual food consumption of urban families have been obtained. No data are currently available to measure the seasonal nature of the farm family's diet, which probably changes more with season than does the average city diet.

Tables

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With modern transportation, refrigeration, and processing, there is much less seasonal variation in the kinds and amounts of foods consumed than was true years ago. Yet some foods, especially fresh fruits and vegetables, are still "in" or "out" of season and many people still consider some foods too "heavy" to eat in the summer. This report was prepared to give quantitative estimates of these and other seasonal shifts in the consumption of food by city families.

Because of seasonal substitutions within broad groups of foods, consumption of food groups shows much less seasonality than does consumption of individual foods. For the diet as a whole, estimates of nutritive value show little seasonal change. Diets in the summer tend to be lower in nutritive quality than in other seasons of the year, but the margin of difference is not large.

Food consumption for spring, on the whole, is more nearly like the annual average pattern than is any other season. This suggests that if dietary surveys can be made only in one season of a year, spring is the most suitable season.

A brief summary of the average U. S. seasonal patterns of major foods follows:

1. Fruit and vegetable consumption fluctuates more with season than does consumption of any other group of foods. As might be expected, the fresh and processed products show opposite seasonal movements. The processed commodities are used in larger quantities in the winter and spring while fresh fruits and vegetables, except citrus fruit, are used most extensively in summer and fall. When citrus fruit consumption is high in relation to the annual average, consumption of other fruit is low. Fluctuations in the use of processed juices are considerably smaller than those of either the fresh or processed fruits and vegetables.

2. Milk and milk products (excluding butter) show little seasonal movement as a total food group, although individual items have marked seasonal patterns. The consumption of fluid milk, the largest component, is relatively steady throughout the year. Cheese consumption is highest in the winter and lowest in the summer. Ice cream consumption is the converse, with summer the seasonal high and winter and fall much lower in consumption.

3. Meat, poultry, and fish consumption is stable the year round for the group as a whole. Except for a decline in summer, total meat consumption varies little season by season because of substitutions among the types of meat used. This decline in the summer results from the use of smaller quantities of beef than during the year as a whole. Although less fresh pork also is used in

the summer, greater use of the smoked varieties brings the total summer pork figure to the annual average. Poultry consumption is highest in the summer while fish consumption is low in the summer and highest in the winter.

4. Egg consumption is lowest in summer and highest in spring, reflecting somewhat the seasonal price and production pattern for eggs.

5. Sugars and sweets show moderate seasonal fluctuations, with consumption highest in winter and lowest in spring and summer. Sugar purchased for family use has relatively little seasonal movement. The other component of the group--sirups, jellies, jams, and candy--has greater seasonal fluctuations in consumption, with summer decidedly lower than the annual average, and winter, higher.

6. Bakery goods purchases as a whole are fairly stable from season to season. Bread, a large share of all bakery goods, is bought in about the same quantities throughout the year, with purchases slightly higher in the fall than in the other three seasons. Use of baked goods other than bread increases in winter and drops off in spring and summer when ice cream and other desserts may often take the place of cake and pie in family meals.

7. Flour and cereal foods (excluding purchased baked goods) are used in larger quantities in winter and in smaller quantities in the summer.

8. Fats and oils purchases have practically no seasonal variations.

9. Soups and prepared or partially prepared dishes are used in considerably smaller quantities in the summer than during the rest of the year. Purchases are highest in the winter.

Nutritive value of diets. Seasonal changes in the nutritive value of city diets are small compared with the wide swings in the use of some individual food items and with the shifts in the use of total groups such as fresh fruit and fresh vegetables. Opposite seasonal consumption of foods which are sources of the same nutrients makes for relatively stable average nutritive content of diets. For example, the average vitamin C (ascorbic acid) content of city diets in each of the four seasons varies from the all-year average by less than 4 percent. Contributing to this stability is the fact that the consumption of vitamin C-rich citrus fruit is at its peak when the consumption of other fresh fruits and fresh tomatoes is at a seasonal low.

Summer diets of city families have a slightly lower nutritive content than diets in the other seasons of the year. Against small decreases in such foods as dairy products, fats and oils, grain products, sugar and sweets, and potatoes are balanced rather considerable increases in the use of fresh fruits and vegetables. The net effect is to make the estimated average number of calories in the summer diets 5.5 percent lower than the year's average. The smaller amounts of food energy value in summer diets probably reflect not only a shift to foods typical of summer menus, but also an actual decrease in food-energy needs.

The vitamin A value of urban diets shows more seasonal variation than any of the other nutrients for which calculations are usually made. Amounts of this vitamin in diets were lowest in the summer and highest in the fall. Many foods contribute vitamin A value to diets and the seasonal changes in the total family food supplies are the net result of shifts in the consumption of several foods. Among them is the seasonal shift in the use of sweetpotatoes, from a seasonal low in the summer to a high in the fall.

Table 1.--SEASONAL INDEXES OF URBAN FOOD PURCHASES, 1948: Average purchased quantities used at home per household, each season as a percent of spring and as a percent of the yearly average

Food item	Spring (Apr.-June) = 100				Yearly average = 100			
	Winter (Dec.-Mar.)	Summer (July-Aug.)	Fall (Sept.-Nov.)	Yearly average	Winter (Dec.-Mar.)	Spring (April-June)	Summer (July-Aug.)	Fall (Sept.-Nov.)
Milk (total fluid milk equivalent) 1/...	106.8*	95.8	98.4	101.2	105.5*	98.8	94.7*	97.2
Milk, fluid, canned, dry (fluid equiv.)..	107.9*	98.6	101.2	102.7	105.1*	97.4	96.0	98.5
Whole fluid milk.....	107.0	99.1	101.7	102.6	104.3	97.5	96.6	99.1
Cream, ice (fluid milk equiv.).....	84.5*	102.6	78.5*	89.9*	94.0	111.2*	114.1*	87.3*
Ice cream.....	82.5*	117.6*	81.0*	92.4	89.3*	108.2	127.3*	87.7*
Cheese.....	106.9	82.2*	90.6	97.0	110.2*	103.1	84.7*	93.4*
Fats and oils 1/.....	103.6	98.5	101.4	101.3	102.3	98.7	97.2	100.1
Table fat.....	104.7	98.0	100.0	101.2	103.5	98.8	96.8	98.8
Butter.....	99.6	98.1	103.2	100.3	99.3	99.7	97.8	102.9
Shortening, oils, dressings.....	102.7	98.9	102.6	101.4	101.3	98.6	97.5	101.2
Flour and cereal foods 1/.....	112.9*	91.5*	98.7	102.6	110.0*	97.5	89.2*	96.2*
Flour and meal.....	114.4*	97.9	97.8	103.9	110.1*	96.2	94.2*	94.1*
Cereals and pastes.....	110.5*	82.1*	100.3	100.6	109.8*	99.4	81.6*	99.7
Bakery products 1/.....	104.3	99.2	108.4*	103.4	100.9	96.7	95.9*	104.8*
Bread.....	100.8	100.0	108.0*	102.3	98.5	97.8	97.8	105.6*
Other baked goods.....	114.7*	96.9	109.6	106.8*	107.4*	93.6*	90.7*	102.6
Eggs.....	96.7	86.0*	89.7*	94.0*	102.9	106.4*	91.5*	95.4
Meat, poultry, fish 1/.....	103.9	93.8*	99.3	100.1	103.8*	99.9	93.7*	99.2
Meat 1/.....	104.8	90.9*	100.9	100.3	104.5*	99.7	90.6*	100.6
Beef.....	106.8	88.5*	96.8	99.5	107.3*	100.5	88.9*	97.3
Pork 1/.....	97.9	98.8	99.9	99.1	98.8	100.9	99.7	100.8
Fresh.....	112.9	89.5	99.4	102.4	110.3*	97.7	87.4*	97.1
Smoked.....	84.5*	107.2	100.4	96.1	87.9*	104.1	111.6*	104.5
Bacon.....	99.3	99.6	112.0*	102.7	96.7	97.4	97.0	109.1*
Veal, lamb, variety meats.....	119.8*	66.3*	99.1	100.7	119.0*	99.3	65.8*	98.4
Frankfurters and cold cuts.....	102.6	102.3	119.4*	106.1	96.7	94.3	96.4	112.5*
Poultry.....	96.3	112.0	95.8	99.7	96.6	100.3	112.3*	96.1
Fresh chicken.....	99.0	112.6	96.6	100.9	98.1	99.1	111.6*	95.7
Fish and shellfish.....	107.7	90.7*	90.5*	98.6	109.2*	101.4	92.0*	91.8*

Sugars and sweets 1/	117.0*	100.0	106.2	107.2*	109.1*	93.3*	93.3*	99.1
Sugars	110.0*	107.1	107.4	106.4*	103.4	94.0*	100.7	100.9
Sweets	132.8*	83.7*	103.3	109.0*	121.8*	91.7*	76.8*	94.8*
Fresh fruits 1/	99.4	217.6*	114.0	122.9*	80.9*	81.4*	177.1*	92.8*
Citrus	105.8	62.8*	55.9*	84.7*	124.9*	118.1*	74.1*	66.0*
Other	90.5*	432.5*	194.6*	176.0*	51.4*	56.8*	245.7*	110.6*
Potatoes and sweetpotatoes	109.9*	92.7*	104.4	103.2	106.5*	96.9	89.8*	101.2
Potatoes	104.1	95.8	98.0	100.2	103.9	99.8	95.6*	97.8
Fresh vegetables 1/	90.6*	138.1*	136.8*	112.4*	80.6*	89.0*	122.9*	121.7*
Tomatoes	54.2*	234.2*	285.9*	153.6*	35.3*	65.1*	152.5*	186.1*
Leafy, green and yellow	99.6	98.7	103.9	100.6	99.0	99.4	98.1	103.3
Other	85.5*	182.3*	149.8*	121.4*	70.4*	82.4*	150.2*	123.4*
Canned and frozen fruits	124.7*	52.9*	53.1*	88.6*	140.7*	112.9*	59.7*	59.9*
Canned and frozen vegetables	127.0*	40.1*	67.8*	90.9*	139.7*	110.0*	44.1*	74.6*
Canned and frozen juices	104.1	95.1	105.9	102.0	102.1	98.0	93.2	103.8
Dried fruits and vegetables, nuts	127.6*	63.3*	83.8*	99.0	128.9*	101.0	63.9*	84.6*
Soups, prepared and partially prepared dishes	123.1*	70.9*	114.8*	106.5	115.6*	93.9	66.6*	107.8

1/ The indexes for these food groups were obtained by weighting the seasonal indexes of the component items by their relative importance in spring 1948 urban food purchases.

*Significantly different from 100 at the 5 percent level.

Table 2.--SEASONAL INDEXES OF NUTRITIVE VALUE OF URBAN DIETS, 1948: Average nutritive value of food consumed at home per nutrition unit per day, each season as a percent of spring and of the yearly average

Nutrient	Winter (Dec.-March)	Spring (April-June)	Summer (July-Aug.)	Fall (Sept.-Nov.)	Yearly average
	Each season as a percent of spring				
Food energy.....	104.3*	100.0	94.5*	98.1	100.0
Protein.....	103.5*	100.0	90.3*	97.3	98.9
Calcium.....	103.4	100.0	92.4*	97.5	99.2
Iron.....	105.2*	100.0	90.1*	96.9*	99.3
Vitamin A value.....	108.8*	100.0	90.3*	111.5*	104.2*
Thiamine.....	103.1	100.0	95.8*	98.5	100.0
Riboflavin.....	103.4*	100.0	92.2*	98.3	99.4
Niacin.....	105.6*	100.0	93.3*	98.5	100.4
Ascorbic acid.....	99.5	100.0	93.4*	93.4*	97.1
	Each season as a percent of the yearly average				
Food energy.....	104.3*	100.0	94.5*	98.1	100.0
Protein.....	104.5*	100.9	91.1*	98.2*	100.0
Calcium.....	104.3*	100.9	93.2*	98.3	100.0
Iron.....	105.8*	100.5	90.6*	97.4*	100.0
Vitamin A value.....	104.2*	95.8*	86.4*	106.8*	100.0
Thiamine.....	103.1*	100.0	95.8*	98.9	100.0
Riboflavin.....	104.1*	100.7	92.8*	99.0	100.0
Niacin.....	105.2*	99.6	93.0*	98.1*	100.0
Ascorbic acid.....	102.3	102.8	96.0*	96.0*	100.0

*Significantly different from 100 at the 5 percent level.

Table 3.--PURCHASED QUANTITIES OF SELECTED FOODS, SPRING AND AVERAGE 1948: Average purchased quantities of selected foods used at home in a week, and in a year, per household and per person

(Urban housekeeping families of 2 or more persons)

Food item	Per household			Per person 1/		
	Spring 1948 2/	Average 1948		Spring 1948	Average 1948	
	Week	Week	Year	Week	Week	Year
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Milk (total fluid milk equivalent) 3/....	33.55	33.95	1,765	9.81	9.93	516
Milk,fluid,canned,dry (fluid equiv.) 3/	26.28	26.99	1,403	7.68	7.89	410
Whole fluid milk.....	21.72	22.28	1,159	6.35	6.51	339
Cream, ice cream (fluid equiv.) 3/.....	1.31	1.18	61	.38	.35	18
Ice cream.....	.80	.74	38	.24	.22	11
Cheese.....	.97	.94	49	.28	.27	14
Fats and oils.....	2.95	2.99	155	.85	.87	45
Table fat.....	1.36	1.38	72	.40	.40	21
Butter.....	.76	.76	40	.22	.22	11
Shortening, oils, dressings.....	1.59	1.61	84	.46	.47	24
Flour and cereal foods.....	4.56	4.68	243	1.33	1.37	71
Flour and meal.....	2.83	2.94	153	.83	.86	45
Cereals and pastes.....	1.73	1.74	90	.50	.51	27
Bakery products.....	8.20	8.48	441	2.40	2.48	129
Bread.....	6.14	6.28	327	1.80	1.84	96
Other baked goods.....	2.06	2.20	114	.60	.64	33
Eggs.....	2.68	2.52	131	.78	.74	38
Meat, poultry, and fish.....	10.48	10.49	545	3.07	3.07	160
Meats.....	8.13	8.15	424	2.38	2.38	124
Beef.....	3.19	3.17	165	.94	.93	48
Pork.....	2.92	2.89	150	.85	.85	44
Fresh pork.....	1.38	1.41	73	.40	.41	21
Smoked pork.....	1.54	1.48	77	.45	.43	22
Bacon.....	.70	.72	37	.20	.21	11
Veal, lamb, variety meats, game.....	1.07	1.08	56	.31	.32	17
Frankfurters, cold cuts.....	.95	1.01	53	.28	.30	16
Poultry.....	1.44	1.44	75	.42	.42	22
Fresh chicken.....	1.36	1.37	71	.40	.40	21
Fish and shellfish.....	.91	.90	47	.26	.26	14
Sugars and sweets.....	4.10	4.40	229	1.20	1.29	67
Sugars 4/.....	2.85	3.03	158	.84	.89	46
Sweets.....	1.25	1.36	71	.36	.40	21
Fresh fruits.....	11.75	14.44	751	3.44	4.22	219
Citrus.....	6.83	5.79	301	2.00	1.69	88
Other.....	4.92	8.66	450	1.44	2.53	132
Potatoes and sweetpotatoes.....	6.99	7.21	375	2.04	2.11	110
Potatoes.....	6.73	6.74	350	1.97	1.97	102
Fresh vegetables.....	9.24	10.39	540	2.70	3.04	158
Tomatoes.....	.97	1.49	77	.28	.44	23
Leafy, green, and yellow.....	5.49	5.52	287	1.61	1.61	84
Other.....	2.78	3.37	175	.81	.99	51
Canned and frozen fruits.....	1.78	1.58	82	.52	.46	24
Canned and frozen vegetables.....	3.24	2.95	153	.95	.86	45
Canned and frozen juices.....	2.43	2.48	129	.71	.73	38
Dried fruits, vegetables and nuts.....	.99	.98	51	.29	.29	15
Soups, prepared, and partially prepared dishes.....	1.16	1.24	64	.34	.36	19

1/ 21 meals at home per week equals one person.
2/ See Preliminary Report No. 5, Food Consumption of Urban Families in the United States.
3/ Approximately the quantity of fluid milk to which the various dairy products are equivalent in minerals and protein.
4/ Excludes sugar for home canning.

Table 4.--CONSUMPTION OF 11 MAJOR FOOD GROUPS, SPRING 1948 AND AVERAGE 1948: Average quantity of 11 food groups consumed at home in a week and in a year, per household and per person 1/

(Urban housekeeping families of 2 or more persons)

Food group	Average quantity consumed 2/ at home					
	Per household			Per person 3/		
	Spring 1948 4/	Average 1948		Spring 1948	Average 1948	
	Week	Week	Year	Week	Week	Year
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Milk, cream, cheese, equivalent 5/.....	34.24	34.64	1,801	10.01	10.13	527
Fats and oils 6/.....	3.80	3.84	200	1.11	1.12	58
Grain products 7/.....	9.34	9.65	502	2.73	2.82	147
Eggs.....	2.90	2.71	141	.85	.79	41
Meat, poultry, and fish 8/.....	10.29	10.33	537	3.01	3.02	157
Dry peas, beans, nuts, and cocoa.....	.94	.95	49	.27	.28	15
Sugars and sweets 9/.....	4.86	5.15	268	1.42	1.51	79
Citrus and tomatoes.....	11.80	13.00	676	3.45	3.80	198
Leafy, green, and yellow vegetables.....	7.63	7.99	415	2.23	2.34	122
Other vegetables and fruits.....	13.43	17.54	912	3.93	5.13	267
Potatoes and sweetpotatoes.....	7.26	7.47	388	2.12	2.18	113

1/ Annual estimates were derived by seasonally adjusting purchased quantities of all food groups and by seasonally adjusting home-produced and gift or pay quantities if they amounted to at least 5 percent of the purchased quantities.

2/ Food from all sources, purchased, gift or pay, and home-produced.

3/ 21 meals at home per week equals 1 person.

4/ See table 17 of Preliminary Report No. 5, Food Consumption of Urban Families in the United States.

5/ Approximately the quantity of fluid milk to which the various dairy products are equivalent in minerals and protein.

6/ Includes bacon and salt pork.

7/ Flour equivalent of grain products.

8/ Excludes bacon and salt pork.

9/ Includes the sugar equivalent of soft drinks and prepared desserts. Excludes sugar for home canning.

Table 5.--NUTRITIVE VALUE OF URBAN DIETS, SPRING 1948 AND AVERAGE 1948: Average nutritive value of food consumed at home per nutrition unit and per person per day 1/

(Urban housekeeping families of 2 or more persons)

Nutrient	Per nutrition unit 2/		Per person	
	Spring 1948 3/	Average 1948	Spring 1948 3/	Average 1948
Food energy.....Calories	3,810	3,810	3,040	3,040
Protein.....Grams	102	101	93	92
Calcium.....Grams	1.07	1.06	1.10	1.09
Iron.....Milligrams	17.5	17.4	16.7	16.6
Vitamin A value.....International units	10,100	10,500	9,100	9,500
Thiamine.....Milligrams	2.35	2.35	1.85	1.85
Riboflavin.....Milligrams	2.66	2.64	2.33	2.32
Niacin.....Milligrams	24.2	24.3	19.0	19.1
Ascorbic acid.....Milligrams	167	162	153	149

1/ Represents the nutritive value of food brought into the kitchen for household use less the nutritive value of small quantities of edible food estimated by families to have been discarded or fed to animals. No allowance has been made for losses that may have occurred during cooking or storage of left-overs.

2/ For each nutrient the needs of a physically active man were considered to be a nutrition unit. Factors that relate other persons of specified age, sex, and physical activity to the physically active man were derived from the National Research Council's Recommended Dietary Allowances, Rev. 1948, Reprint and Circular Series No. 129.

3/ From Preliminary Report No. 12, Nutritive Value of Diets of Urban Families, United States, Spring 1948, and Comparison with Diets in 1942.

Methodology

The seasonal indexes presented in this report were derived chiefly to represent 1948. Because changing weather, price, production, consumer income, and agricultural price support conditions may cause year-to-year differences in seasonal variations, the indexes may need some modification if applied to past or future years.

In deriving the seasonal indexes, survey data collected in various seasons of 1948 and 1949 in four cities of the United States were used extensively. The time, place, number of families, average income, and average household size of these surveys are indicated in table 6.

Table 6.--SCOPE OF SURVEY DATA USED IN DERIVING SEASONAL INDEXES: Place, time, number of families, average income, and average household size

City	Season	Period covered	Year	Number of families	Average annual family income 1/ (dollars)	Average household size 2/
Birmingham	Winter	Jan. 13-March 19	1948	139	2,640	2.45
	Spring	Mar. 29-June 21	1948	163	2,599	2.42
	Fall	Sept. 6-Oct. 15	1948	146	2,735	2.47
	Spring	Mar. 29-June 3	1949	140	2,779	2.49
	Summer	June 29-Aug. 11	1949	159	2,808	2.56
Buffalo	Winter	Feb. 2-April 14	1948	100	3,031	2.57
	Spring	April 12-June 18	1948	165	2,869	2.45
	Fall	Sept. 6-Oct. 22	1948	147	2,966	2.57
Minneapolis-St. Paul	Winter	Jan. 15-April 2	1948	113	3,277	2.60
	Spring	Mar. 29-June 25	1948	166	3,252	2.41
	Fall	Sept. 6-Oct. 28	1948	159	3,161	2.47
	Spring	April 4-June 23	1949	149	4,020	2.25
	Summer	June 30-Aug. 18	1949	147	3,919	2.31
San Francisco	Winter	Jan. 13-April 2	1948	158	3,929	2.19
	Spring	Mar. 29-June 29	1948	167	3,820	2.34
	Fall	Sept. 6-Nov. 9	1948	157	3,792	2.41

1/ Family income of the previous year after deduction of Federal income taxes.

2/ Only housekeeping families of 2 persons 16 years or over and 0, 1, or 2 children aged 2-15 years were included in these surveys. Average household size is expressed in terms of a 21-meal equivalent person (21 meals at home equals 1 person).

The national urban survey used as the basis for obtaining estimates of annual consumption was made in the spring of 1948 (April through June) and covered almost 1,600 families of all sizes and composition located in 68 cities.

As can be noted from the above table, the available seasonal data were limited in many respects. Before these data were used to obtain a national seasonal pattern of urban food consumption, a number of questions had to be investigated. These problems and the assumptions made in developing the method used in constructing the seasonal indexes are discussed in the following sections.

Questions to be investigated:

1. Selected family types.--The four-city seasonal data are for families of selected size and composition, while the national urban data are for all types of families. Although, on the average, families of selected types purchase somewhat different quantities of many foods than do families of all types, will they necessarily have different seasonal patterns? Will the seasonal patterns in food purchases of families of selected types be representative of the seasonal patterns of all family types?

Urban families average somewhat larger than the families of selected size and composition for whom seasonal data are available. Since per capita income is generally lower for large families than for small families, it might be expected that large families would spend their food money more carefully and respond more readily to seasonal changes in food prices than would smaller families. Consequently, food purchases of large families might tend to have more extreme seasonal movements than those of small families.

Investigation indicates, however, that for many foods price is not an important cause of seasonal movements in food purchases. For when the seasonal changes in average quantities of 35 foods consumed were compared with the changes in price during the corresponding seasons, only two-thirds of the cases had an inverse price/quantity relationship. In one-third of the comparisons, higher prices were associated with greater consumption.

Thus, for many foods, factors such as climate, habit, and availability probably play a large part in causing seasonal movements in consumption. These factors would have the same effect on food purchases of both small and large families, and would not tend to cause dissimilar seasonal patterns for the two family-size groups.

For the relatively few foods for which price is the predominant factor in determining seasonal consumption patterns, there may be systematic differences in the seasonal patterns of large and small families. To some extent, therefore, the use of the data for selected family types may underestimate the magnitude of a few seasonal indexes in this report.

2. Combination of data from the four cities.--What weighting scheme should be used to combine the data for the four cities into a national seasonal pattern? Can they be treated as samples of food consumption in four geographic areas?

The four cities surveyed in 1948 are located in diverse sections of the United States. However, these cities were not necessarily chosen to represent the food consumption of urban families in their respective regions. Because of the considerable diversity in food habits, even within a region, no one city can give a completely accurate picture of a regional food pattern. The four cities surveyed are all large cities and may not represent the consumption patterns of the small cities within the regions. For these reasons the four cities may not represent accurately the actual levels of consumption in the four regions.

Because spring 1948 food consumption data are available for both the total United States and the four cities, it is possible to determine how well a combination of the four cities would approximate average United States urban consumption. When the consumption data for Birmingham, Buffalo, Minneapolis-St. Paul, and San Francisco were combined with the 1946 Census population weights 1/ of the South, Northeast, North Central, and West Regions, the weighted averages compared well to the consumption figures obtained from the spring 1948, all U. S. urban sample 2/. This was particularly true for the major food groups.

1/ Bureau of the Census, Current Population Reports, Consumer Income, P-60. Birmingham (South Region), 21.4 percent; Buffalo (Northeast Region), 35.2 percent; Minneapolis-St. Paul (North Central Region), 30.5 percent; San Francisco (West Region), 12.9 percent.

2/ For purposes of this comparison, the four-city data were adjusted to represent consumption of all families, not just selected family types.

On the basis of this comparison it was decided that the four cities gave a good enough representation of regional differences in consumption and of regional differences in seasonal patterns to derive United States seasonal indexes by combining the actual consumption data for the four cities (with Census population weights) and then computing seasonal indexes 3/.

3. Summer seasonal adjustment

A. Surveys in two cities only.--For the summer season, data are available for Birmingham and Minneapolis-St. Paul only. Can an index for the U. S. be computed from only these two cities?

To investigate this problem, a comparison of two-city and four-city average seasonal indexes in the winter and fall of 1948 was made for about 35 food items. In general, it was concluded from these comparisons that a seasonal index based on two rather than four cities would have yielded considerably different average indexes for the U. S. For most of the food items, however, a two-city average would have yielded seasonal indexes of the same direction as a four-city average but of greater amplitude. A downward adjustment (towards 100) in amplitude of the seasonal indexes, would have made the two-city indexes more similar to the four-city indexes, and there would no longer have been a tendency for the amplitude of the seasonal indexes to be overstated more frequently than understated.

It was therefore assumed that if an adjusted average of the two cities improved the seasonal estimates for the fall and winter seasons, it would do likewise for the summer season. Accordingly, an amplitude adjustment was made in deriving summer indexes from the Birmingham and Twin Cities data.

B. 1949 summer fitted into 1948.--For the summer, data were available for 1949 only, while it was for 1948 that the seasonal pattern was to be derived. Was the seasonal pattern evidenced in the summer of 1949 the same as the seasonal pattern that existed for the summer of 1948?

Because of changes between 1948 and 1949 in food prices, general cost of living, and average income of the families surveyed, actual levels of food consumption in Birmingham and Minneapolis-St. Paul

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3/ Although the four cities were used to represent regional differences in consumption, they were not thought to represent actual regional patterns well enough to warrant constructing separate regional indexes. For those persons interested in the seasonal patterns of consumption in the four cities separately, table 7 (p. 16) gives the seasonal indexes for 14 broad groups of foods. A corresponding table on the nutritive value of diets is given in Special Report No. 2, Nutritive Content of City Diets, Bureau of Human Nutrition and Home Economics, ~~this report~~.

differed in the two years, with 1949 higher for most foods. Despite the differences in consumption between spring 1948 and spring 1949, the seasonal patterns might have been the same, if the summer-spring relationships for weather, availability, and price of foods were similar in the two years.

Examination of retail price data, of statistics on climate, and of the limited amount of data on seasonal supplies of foods, indicates that for some foods, particularly meats, the 1948 and 1949 spring to summer seasonal patterns in consumption might have differed. Little basis for devising any adjustments exists, however, and because of this none have been made.

4. No surveys in November and December.--The seasonal data from the surveys (1948 and 1949 together) cover only 10 months of the year. Can satisfactory seasonal indexes be calculated with November and December unrepresented? How will the data be biased by the exclusion of these months?

November and December, being holiday months, undoubtedly have unique food consumption patterns. Without consumption data for these months, seasonal indexes for fall and winter are too low for traditional holiday foods such as turkey, cranberries, and nuts. Nevertheless because there is no reliable basis for estimating food consumption in November and December, the seasonal indexes were derived from data for only 10 months.

In combining the seasonal indexes into annual estimates, the missing months were apportioned to the months considered to be most nearly related to them in terms of consumption patterns, that is, November to September and October, and December to January, February, and March. Hence, winter was given a weight of four (to represent December, January, February, and March), spring a weight of three (April, May, and June), summer a weight of two (July and August), and fall a weight of three (September, October, and November).

5. Seasonal adjustment by income class.--Do the same seasonal indexes apply to the food consumption of families in both high- and low-income classes? Can average indexes for all income classes combined be used for both the high- and low-income classes?

Because seasonal price movements and seasonal changes in availability may operate differently for different income groups, differences might be expected among the income classes in the magnitude of their seasonal consumption patterns. With this in mind, seasonal indexes were computed for the income class under $2,000 and for the class $4,000 and over. These indexes were then compared to one another and to the indexes based on all families.

Both the high- and low-income classes showed more extreme seasonal variation than the average, and in many cases showed seasonal movements of an opposite direction from the average for families of all incomes. In only about 60 percent of the cases were the seasonal indexes for the highest and lowest income classes in the same direction. Where the indexes were in the same direction, about half the time the lowest income class showed more extreme seasonals than the highest income class, and the other half of the time the reverse was true.

It is not to be expected, however, that one income class would show more extreme seasonal indexes than the other in all cases. For the foods in which price changes play a large part in seasonal consumption movements, it might be expected that the income groups with more limited food money would show greater seasonal movements than the higher income groups. On the other hand, for many foods, which are considered seasonal delicacies but are not extensively purchased by the lower income groups, the highest income groups might show the greatest seasonal changes in consumption. When an attempt was made to classify foods into these types of groups, a slight tendency was noted for the lower income classes to have more extreme seasonal consumption patterns in the cases where price might be a more important causal seasonal factor, and for the highest income groups to have more extreme seasonal movements for foods where seasonal availability might be more of an important factor.

Although there may be some systematic differences between the seasonal indexes of high- and low-income families, the available data, with its relatively small number of cases, were too subject to chance fluctuations to yield a picture of these differences, food by food. Given these limited data it seemed more advisable to use the seasonal indexes based on all cases than to attempt to derive different seasonal indexes for each income class.

Reliability of seasonal estimates

An examination of the variability of the four-city consumption data, together with the above limitations of the data for the purpose of constructing seasonal indexes, indicated that many differences in consumption could be due to chance factors and that seasonal adjustments could be made only for fairly broad food groups and certain major food items. For these reasons it was decided that with a few minor exceptions, seasonal indexes would not be computed for any food items or subgroups that did not account for at least 2 percent of the urban household food budget in the spring of 1948. For items of lesser importance the quantities used and the percent of survey families reporting use were too small to give validity to the data for national seasonal adjustments. A "t" test was performed comparing each seasonal average with the average of the base (spring and annual) and an asterisk (*) indicates those indexes in tables 1 and 2 which are significantly different from 100 at the 5 percent level.

Table 7.--SEASONAL INDEXES OF FOOD PURCHASES IN FOUR CITIES, 1948: Average purchased quantities used at home per household, each season as a percent of spring 1/

(Housekeeping families of 2 persons 16 years or over and 0, 1, or 2 children, aged 2-15 years)

Food group	Birmingham, Ala. 2/			Minneapolis-St. Paul, Minn. 2/			Buffalo, N. Y. 2/		San Francisco, Calif. 2/	
	Winter	Summer 3/	Fall	Winter	Summer 3/	Fall	Winter	Fall	Winter	Fall
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Milk equivalent	111.0	86.3	103.0	105.3	96.1	91.8	111.5	100.7	91.9	101.8
Fats and oils	104.8	91.7	101.1	109.7	99.0	104.8	100.5	95.0	86.5	94.0
Flour and cereal foods	110.0	94.6	92.1	131.1	79.8	96.4	109.5	105.9	100.1	119.2
Bakery products	106.5	92.4	110.0	106.2	103.2	111.1	104.0	107.2	98.6	103.9
Eggs	96.6	76.4	100.9	105.8	88.3	84.9	93.7	82.9	84.1	100.6
Meat, poultry, fish	104.3	88.5	101.4	105.3	98.0	99.0	105.8	101.2	93.0	91.6
Sugars and sweets	120.8	97.1	107.9	119.6	103.4	105.6	118.4	107.0	98.7	99.7
Fresh fruits	102.4	304.8	95.0	111.7	140.0	121.6	93.3	98.1	91.4	118.4
Fresh potatoes, sweetpotatoes	130.8	78.2	124.1	107.2	96.5	98.6	107.2	105.1	99.2	91.0
Fresh vegetables	116.6	171.1	160.0	84.5	116.6	114.3	91.9	152.0	76.5	110.6
Dried fruits and vegetables and nuts	134.3	59.5	73.7	137.8	61.6	84.7	118.9	84.3	106.3	109.7
Frozen fruits and vegetables	209.3	113.7	113.0	138.2	73.7	57.1	69.5	71.6	172.7	79.7
Canned fruits, vegetables, juices	125.1	58.0	61.7	123.4	66.5	74.1	119.7	68.5	113.5	96.0
Prepared or partially prepared dishes and soups	222.0	51.5	79.4	111.7	77.6	129.7	109.1	115.3	103.5	114.0

1/ Computed from data presented in Preliminary Reports 8-11 and unpublished material from the 1948-1949 food consumption surveys. No surveys were made in the summer in Buffalo and San Francisco.

2/ See page 10, for exact dates of the seasons in each city.

3/ Summer 1949 as a percent of spring 1949.

List of Publications
1948 Food Consumption Surveys

Preliminary Reports (technical research reports) — No.

Commodity Summaries (based on above reports--of particular interest to market analysts)

1. Meat Selections of City Families
2. Fats and Oils Consumed by City Families
3. Grain Products Consumed by City Families
4. Eggs and Poultry in City Diets
5. Sugars and Sweets in City Diets
6. Dairy Products in City Diets
7. Potatoes and Sweetpotatoes Consumed by City Families
8. Citrus Fruit Consumed by City Families
9. Fruit Selections of City Families
10. Vegetable Selections of City Families

Special Reports

1. Food Consumption Trends in Birmingham, Alabama, 1935, 1946 and 1948.
2. Nutritive Content of City Diets...A Summary Report including some previously unpublished data.
3. Seasonal Patterns of Food Consumption, City Families, 1948 (this report)